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Psychopathy Checklist-Revised (PCL-R) Factor Structure in Male Perpetrators of Intimate Partner Violence

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ABSTRACT

Psychopathy Checklist-Revised (PCL-R) is the gold standard for assessing psychopathy. However, its factorial structure has been subject of debate, and different factor models have been proposed. Furthermore, research has not focused on the PCL-R factorial structure among intimate partner violence (IPV) perpetrators. We analyzed and compared the fit of nine alternative models of PCL-R among a sample of 242 IPV perpetrators. Results revealed PCL-R has adequate factor validity. The three-factor model without testlets provided the best fit to the current data. The three-factor model also showed good reliability, and the factors established differential associations to penal and personal variables thus revealing discriminant validity. In the current study, psychopathy was thus best conceptualized as a clinical construct comprising a particular affective functioning (e.g., shallow affect, lack of empathy), and a specific interpersonal (e.g., egocentricity, deception) and behavioral style (e.g., irresponsibility, impulsivity) among IPV perpetrators.

KEYWORDS

PCL-R; psychopathy; intimate partner violence perpetrators; validity; assessment

Introduction

Psychopathy has been widely conceptualized as a clinical construct comprising of interpersonal (e.g., egocentricity, deception, manipulation), affective (e.g., shallow affect, a lack of empathy, guilt, or remorse), and behavioral characteristics (e.g., irresponsibility, impulsivity, unethical and antisocial behaviors) (Hare, 2003; Neumann, Hare, & Newman, 2007). This concept of psychopathy is highly rooted in the most prominent assessment instrument in the field: the Psychopathy Checklist – Revised (PCL-R; Hare, 1991, 2003). The PCL-R is a 20-item checklist that uses a semi-structured interview, case history information, and specific criteria to rate each item on a 3-point scale (Hare, 2003). The checklist assesses inferred personality traits and behaviors of psychopathy (cNeumann, Hare, et al., 2007) and the overall level of this construct (Hare, 2003). The PCL-R was originally developed to

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assess a unitary psychopathy construct with 20 correlated items. Nonetheless, psychometric work has suggested psychopathy can be conceptualized rather as a multidimensional construct (e.g., Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Hare, 2003). Alternative structural models of the PCL-R have been proposed, including two-factor (e.g., Hare et al., 1990), three-factor (Cooke & Michie, 2001), and four-factor models (Hare, 2003; Hare & Neumann, 2006). This multiplicity of structural models has contributed to some disagreement surrounding the definition of the psychopathic disorder.

The two-factor model, estimated by an initial exploratory factorial analysis, has been a dominant structural model for many years (e.g., Hare, 1991). This model established that the PCL-R captures two distinct factors of psychopathy: Factor 1 composed of interpersonal (e.g., charm, grandiosity, and deceitfulness/conning) and affective traits (e.g., absence of remorse, empathy, and emotional depth); and Factor 2 comprised behavioral indicators of social deviance, including juvenile delinquency, impulsivity, irresponsibility, and revocation of conditional release. Three of the PCL-R items (promiscuous sexual behavior, many short-term marital relationships, and criminal versatility) did not load on either factor. Several studies have since replicated this two-factor model of psychopathy using exploratory factor analysis (e.g., Medina, Valdés-Sosa, García, Almeyda, & Couso, 2013; see Neumann, Kosson, & Salekin, 2007 for a review).

Cooke and Michie (2001), however, found the two-factor model failed to meet conventional criteria of goodness-of-fit within a confirmatory analytic framework. As a result, the authors proposed an alternative three-factor model including 13 of PCL-R items. The model presented a hierarchical structure in which the superordinate trait, i.e. psychopathy, overarched three correlated factors (Cooke & Michie, 2001; Cooke, Michie, Hart, & Clark, 2004). The first factor comprised four items, reflecting interpersonal traits; the second factor also comprised four items, corresponding to affective traits; the third factor was composed of five items, reflecting an impulsive and irresponsible behavioral style; the antisocial items were removed (Cooke, Michie, & Skeem, 2007). There are at least two variants of the three-factor model: without testlets (e.g., Skeem, Mulvey, & Grisso, 2003) and with testlets (i.e., items highly associated, far more than would be explained by their relations with the underlying latent trait; Cooke & Michie, 2001). The three-factor model has also been replicated with different samples (e.g., Cooke & Michie, 2001; Cooke, Michie, Hart, & Clark, 2005; Cooke & Selbom, 2018; Pérez, Herrero, Velasco, & Rodriguez-Díaz, 2015; Skeem et al., 2003; Weizmann-Henelius et al., 2010).

However, Hare and his colleagues (Hare, 2003; Hare & Neumann, 2006) argued that four factors were needed to describe the structure of PCL-R, representing the interpersonal, affective, behavioral, and the antisocial features of the disorder. Thus, this four-factor model proposal comprised the

three factors identified by Cooke and Michie (2001), labeled "Interpersonal", "Affective", and "Lifestyle", and a fourth factor considering indicators of antisocial behavior, labeled "Antisocial". The four-factor structure model has also been confirmed in several analyses, although with statistical variants, such as a four-factor correlated model, a four facet with one (i.e., a psychopathy construct) or two (i.e., the initial interpersonal/affective and social deviance components) superordinate hierarchical factors (e.g., Eisenbarth, Krammer, Edwards, Kiehl, & Neumann, 2018; Hare, 1991; Hare & Neumann, 2006; León-Mayer, Folino, Neumann, & Hare, 2015; Neumann, Hare, & Pardini, 2015; Vitacco, Neumann, & Jackson, 2005). These models generally include all but two of PCL-R items (sexual promiscuity and numerous marital relationships).

One might argue that the contradictory findings among psychopathy factors may lay on the lack of comparative model analyses (Boduszek & Debowska, 2016). However, different structure models of the PCL-R have been analyzed and compared within the same datasets through confirmatory factor analysis and contradictory results have also emerged (e.g., Cooke et al., 2007; Pérez et al., 2015; Weaver, Meyer, Van Nort, & Tristan, 2006). Cooke et al. (2007) reported a series of analyses of the PCL-R factor structures with a sample of adult male offenders. They tested 11 PCL-R models. The analyses showed the hierarchical three-factor model with testlets was the one that best fit the data. None of the four-factor models achieved acceptable levels of fit, and the one-factor and the two-factor models were implausible. Structure models of the PCL-R have been tested among specific groups of offenders, namely male sex offenders (Weaver et al., 2006), mentally disordered male offenders (Vitacco, Rogers, Neumann, Harrison, & Vincent, 2005), and female homicide offenders (Weizmann-Henelius et al., 2010) from different cultural backgrounds. The comparison of the different models revealed that the three-factor model without testlets (Vitacco et al., 2005) and with six testlets (Weaver et al., 2006; Weizmann-Henelius et al., 2010) was best supported. Nonetheless, other comparison studies with female offenders' samples (Eisenbarth et al., 2018) pointed to the superiority of a four-factor model of psychopathy. Furthermore, a study conducted among Korean serious offenders comparing the two-, three-, and four-factor structures of the PCL-R revealed that both the three- and four-factor models offered, overall, the best fit to the data (Sohn & Lee, 2016).

PCL-R has also been used to assess IPV perpetrators (e.g., Cunha, Braga, & Gonçalves, 2018; Cunha & Gonçalves, 2016; Harris, Hilton, & Rice, 2011; Hilton, Harris, Rice, Houghton, & Eke, 2008; Swogger, Walsh, & Kosson, 2007). Psychopathy has emerged as a significant predictor of IPV perpetration beyond criminal variables (e.g., Cunha et al., 2018; Swogger et al., 2007). Research also indicated that men with psychopathic and antisocial traits commit a disproportional amount of IPV (Swogger

et al., 2007) being 1.6 times more likely to commit IPV compared to other non-psychopathic offenders (Hervé, Vincent, Kropp, & Hare, 2001). Although used to assess IPV perpetrators, the lack of attention that has been given to the factor structure and adjustment of PCL-R and its underlying construct to IPV perpetrators is unsettling. This is important because, although some IPV perpetrators resemble the common offender for whom PCL-R was developed (Hare, 1991), other IPV perpetrators seem to present specific characteristics. Holtzworth-Munroe and Stuart (1994) identified three subtypes of male IPV perpetrators: the generally violent/antisocial who engages in IPV and extra-familial violence who most resembles the common offender; dysphoric/borderline characterized by greater psychological distress and mental health problems whose violence is primarily directed toward their partner, but also shows some violence outside their homes; and family only, a unique IPV perpetrator representing the majority of these offenders. Literature revealed that the generally violent batterer and the psychopath share some characteristics, such as a pattern of generalized violence, alcohol and drug abuse, and a tendency to use instrumental violence (Huss & Langhinrichsen-Rohling, 2000; Spidel et al., 2007). Research also suggests the existence of similarities between generally violent/antisocial batterer and the core features of psychopathy, such as manipulation, remorselessness, and callousness (Huss & Langhinrichsen-Rohling, 2000; Spidel et al., 2007; Swogger et al., 2007). Theobald, Farrington, Coid, and Piquero (2015), using a longitudinal study of males from community samples, concluded that although generally violent IPV perpetrators had the highest mean scores on all facets of the PCL:SV the other type of batterers may also present some psychopathic traits. Other studies revealed that batterers are characterized by greater callousness and poor empathy than other offenders and that batterers presented emotional deficits (e.g., lack of empathy and remorse, deficient emotional expression; Holtzworth-Munroe, Meehan, Herron, Rehman, & Stuart, 2000; Umberson, Anderson, Williams, & Chen, 2003).

Among multidimensional models, as the majority of the PCL-R alternative models, it is also important to examine the differential predictive validity to verify whether the factors correlate differently with external criteria and reflect truly different constructs (Boduszek & Debowska, 2016). This issue has been explored in the last decades, although not so much in the factor analytic work but mostly with regard to the PCL-R risk assessment potential. Studies have systematically highlighted the importance of psychopathy in understanding crime in general (e.g., Hare, 2003; Neumann & Hare, 2008; Porter & Woodworth, 2007), different forms of aggression (Cima & Raine, 2009) and violence in community (Vitacco et al., 2005). PCL-R has been described as a good predictor of

violent and nonviolent recidivism, and these results have been replicated both with different psychopathy factors models (e.g., Dhingra & Boduszek, 2013; Olver, Neumann, Wong, & Hare, 2012; Sewall & Olver, 2018; Sohn, Lyons, Menard, & Lee, 2017). As for the relations between psychopathy factors and criminal outcomes, a meta-analysis of the PCL-R predictive validity concluded that Factor 2 (Antisocial/Unstable Lifestyle) correlated moderately with institutional adjustment and recidivism, whereas Factor 1 (Affective/Interpersonal Traits) was less robustly associated with these outcomes (Walters, 2003). More recent studies have focused on the differential contribution of the four and/or the three factors of PCL-R (in detriment of the two-factors). For instance, another meta-analysis, exploring the relationship between psychopathy and instrumental and reactive violence, found that the interpersonal facet is more important for instrumental violence and lifestyle factor is more significant to reactive violence (Blais, Solodukhin, & Forth, 2014). A study conducted by Hall, Benning, and Patrick (2004), testing the three-factor model, revealed that the interpersonal factor is related to social dominance, low stress reactivity and higher adaptative functioning, the affective factor is associated with low social closeness and violent offending, and the behavioral factor is related with negative emotionality, disinhibition, reactive aggression and poor adaptative functioning. Other studies have highlighted the importance of psychopathy's affective factor in predicting specific types of violence, namely IPV (e.g., Cunha et al., 2018; Swogger et al., 2007).

Analyzing factorial properties is not of mere statistical interest. Although factor analytic work does not reveal *per se* the true nature of a construct (e.g., Skeem & Cooke, 2010), factor structure analyses do allow us to better understand any psychological construct. The structure informs whether measures are consistent with a theoretical understanding of the construct, identifying those features that cluster together to form a coherent syndrome and those that are irrelevant, and how these features relate with each other and with the overarching syndrome (e.g., Santor et al., 2011; Suhr, 2006). As for the PCL-R and despite its popularity, the over reviewed literature clearly shows its factor structure remains a controversial element, giving away to a debate about psychopathy's central features (e.g., Cooke et al., 2004; Hare & Neumann, 2005; Skeem et al., 2003). The core of the debate is that psychopathy, as widely defined (Hare, 2003; Neumann, Hare, et al., 2007), confounds two distinct constructs: a personality disorder and criminal/antisocial behavior (e.g., Cooke et al., 2007). Cooke and coworkers' (Cooke & Michie, 2001; Cooke et al., 2004, 2007) have effusively argued that antisocial behavior is a consequence, "*a causally downstream*" (Cooke et al., 2007, p. 48), of the psychopathic personality disorder whereas antisocial behavior is defined as a symptom in Hare and colleagues' conceptualization (Hare, 2003; Neumann et al., 2007, 2007). This last conceptualization has elsewhere been criticized as

being tautological (e.g., Farrington, 2005; Walters, 2004). Nonetheless, the exclusion of the antisocial factor may be questionable (Hare & Neumann, 2006, 2008; Lynam & Miller, 2012) since the potential for biased prediction of PCL-R when the antisocial factor is eliminated (Vitacco et al., 2005).

Bearing in mind the controversies surrounding the PCL-R factor structure and the lack of studies, to the best of our knowledge, that have aimed to test the validity of its factor models with IPV perpetrators, in the current study we seek to fill these gaps. Specifically, and in line with Boduszek and Debowska (2016), we tested and compared different competing models of PCL-R derived on the basis of previous research and theory among a sample of perpetrators of IPV. Moreover, as recommended for multidimensional models (Boduszek & Debowska, 2016), we assessed the discriminant validity by testing the relation between factors and external variables, namely, previous convictions by domestic violence, previous convictions by other crimes, number of incarcerations, number of different type of crimes committed, aggression, psychopathological symptoms, and frequency of intimate violence.

Materials and methods

Participants

Participants were 242 men who had perpetrated IPV against a female intimate partner or ex-partner and were in correctional facilities serving a prison sentence (n = 116; 49.9%) or in the community serving a suspended prison sentence or with a provisional suspension processes (n = 118; 50.4%). They aged, in average, 43.57 years (SD = 10.82; min = 22, max = 81), and the vast majority (n = 229; 94.6%) were Caucasian. Most of the participants had concluded the sixth or fourth grade (n = 174; 71.9%) and had a low socioeconomic status (n = 148; 61.2%). At the time of the crime, 61.2% (n = 148) of the IPV perpetrators were married or cohabiting with the victim. Almost 60% of the participants had no past criminal record of any type of offense (n = 144; 59.5%) or had no past criminal record of IVP perpetration (n = 138; 57.0%). The participants had been previously incarcerated, in average, .79 times (SD = 1.07) and perpetrated a mean of .70 (SD = 1.09) different types of crimes.

Instruments

The Psychopathy Checklist–Revised (PCL-R; Hare, 1991, 2003) is a 20-item checklist that standardly resorts to a semi structured interview and case history information to rate each item on a 3-point scale (0 = not applied, 1 = applied somewhat, 2 = fully applied) according to specific scoring criteria. PCL-R items comprise interpersonal (e.g., glibness/superficial

charm, grandiose sense of self-worth, pathological lying pathological lying), affective (e.g., lack of remorse or guilt, lack of empathy, boredom), and behavioral characteristics (e.g., irresponsibility, impulsivity, poor behavioral controls, early behavioral problems and criminal versatility) of the psychopathy construct (Hare, 2003). The sum varies between 0 and 40 and reflects the degree to which an individual match the prototypical psychopath at a cutoff score of 30. The checklist provides a general score for psychopathy, a score for two factors (interpersonal/affective and social deviation), and a score for four facets (interpersonal, affective, lifestyle, and antisocial). PCL-R has satisfactory internal consistency (Hare & Neumann, 2005). We used PCL-R's Portuguese version (Gonçalves, 1999), that has shown good psychometric properties (.84 alpha for total scores). The Portuguese version uses the Hare's original cutoff score of 30 (Gonçalves, 1999), although Cooke and coworkers (Cooke & Michie, 1999; Cooke et al., 2005) suggested reducing the diagnostic cutoff to 25 for European settings. In the present study, the checklist was coded independently by two trained psychologists based on interview and file information, and interrater reliability ranged from .74 to .92 as measured by Cohen's kappa coefficient.

The Brief Symptom Inventory (BSI; Derogatis, 1993) is a self-report instrument comprising 53 items that measure psychopathological symptoms, in general, and psychological distress, in particular. Items are evaluated on a five-point scale (0 = not at all to 4 = extremely). The inventory measures nine dimensions and three global indexes of distress. The BSI revealed good psychometric properties. For the purposes of the present study, we only analyze the global severity index (GSI).

The Marital Violence Inventory (IVC; Machado, Gonçalves, & Matos, 2007) is a self-report instrument comprising 21 items evaluated on a three-point scale (0 = never, 1 = once, 2 = more than once). This instrument assesses the frequency of physical and psychological violence perpetrated against an intimate partner.

The Buss-Perry Aggression Questionnaire (AQ; Buss & Perry, 1992) is also a self-report instrument, constituted by 29 items, evaluated on a scale of 5 points, ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). It is divided into four subscales (physical aggression, verbal aggression, anger, and hostility) and a total score. The internal consistency values vary from .72 and .85, concerning the four subscales, and .89 for the total sum. In this study we only examine the aggression total score (Cronbach's alpha = .86).

Sociodemographic characteristics (e.g., age, marital status, education) were assessed through a self-report questionnaire. The individual files of each perpetrator were analyzed to obtain information about criminal history (e.g., previous convictions, recidivism, number of previous imprisonments) and other important information for PCL-R coding.

Procedure

We requested and we were granted authorization from the Portuguese General Directorate of Reintegration and Prison Services–Ministry of Justice (DGRSP-MJ) to assess the institutionalized IPV perpetrators. We collected data in eight national prisons. We also contacted probation services, child protection services, and family services, located in the north of Portugal, to reach noninstitutionalized IPV perpetrators. All the participants signed an informed consent describing the study and the voluntarily and confidential nature of their participation. The participation rate was approximately 85%. Trained psychologists administrated the interviews and the self-report questionnaires individually. Offenders' institutional files were consulted to collect information on their criminal record and antisocial history, and otherwise relevant information for the PCL-R coding. We followed ethic procedures concerning privacy and data protection established by the Portuguese legislation.

Data analysis

Initially, we carried out a Mahalanobis distance analysis and we excluded from the sample 8 participants farthest from the centroid ($p < .001$). As recommended by Boduszek and Debowska (2016), we carried out a series of Confirmatory Factor Analyses (CFA) with the remaining 234 participants to test the model fit for nine models of the PCL-R previously proposed in the literature (see Figure 1): 1) One-factor: all 20 items loading on a single latent variable; 2) Two-factor traditional: eight items in factor 1 (i.e., 1, 2, 4, 5, 7, 8, 6, 16) and 9 items in the factor 2 (i.e., 3, 14, 15, 9, 13, 10, 12, 18, 19); 3) Two-factor amended: identical to the previous model, with exception to the adding of the item 20 in the second factor; 4) Hierarchical three-factor: 4 items in factor 1 (i.e., 1, 2, 4, 5), 4 items in factor 2 (i.e., 7, 8, 6, 16), and 5 items in factor 3 (i.e., 3, 14, 15, 9, 13); 5) Hierarchical three-factor with testlets: identical to the previous model with the addition of the testlets subdividing these items; 6) Hierarchical four-factor: 4 items in factor 1 (i.e., 1, 2, 4, 5), 4 items in factor 2 (i.e., 7, 8, 6, 16), 5 items in factor 3 (i.e., 3, 14, 15, 9, 13), and 5 items in factor 4 (i.e., 10, 12, 18, 19, 20); 7) Hierarchical two-factor, four-facet model: identical to the previous model, although the four factors are considered as facets with two superordinate factors (i.e., factor 1 – facets 1 and 2; factor 2 – facets 3 and 4); 8) Correlated four-factor: in which the previous factors are correlated, rather than the hierarchical model; 9) Two-factor, four-facets "wrong factor": with an identical 18-item structure with the following items swapped, i.e., 4 with 10; 15 with 16. We developed CFAs using the IBM® SPSS® Amos™ 22.

In order to compare the different factorial structures of the PCL-R, we considered Absolut Fit Indexes: a) Chi-Square (χ^2), b) Root Mean Square Residual (RMR), and c) Goodness-of-Fit Index (GFI); Relative Indexes: d) Normed Fit Index (NFI); Parsimony Fit Indexes: e) Parsimony Normed Fit

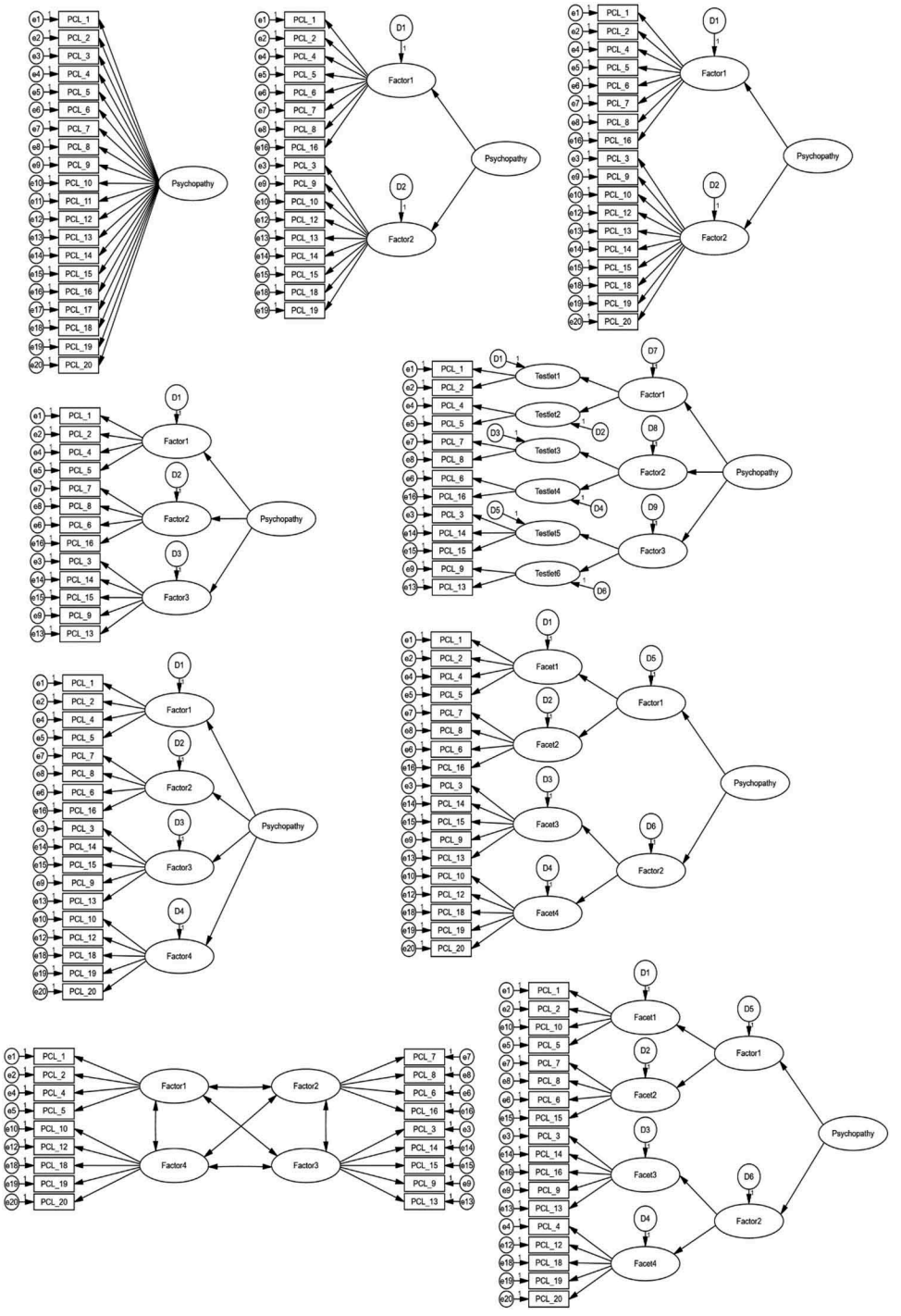

Figure 1. Psychopathy Checklist – Revised (PCL-R) factor structure models according to Cooke et al. (2007), p. 1) One-factor; 2) Two-factor traditional; 3) Two-factor amended; 4) Hierarchical three-factor; 5) Hierarchical three-factor with testlets; 6) Hierarchical four-factor; 7) Hierarchical two-factor, four-facet model; 8) Correlated four-factor; 9) Two-factor, four-facets "wrong factor".

Index (PNFI) and f) Parsimony Goodness-of-Fit (PGFI). When comparing the models, we considered the lowest χ^2 and RSMR values as indicative of better model fit; NFI and GFI values higher than the threshold of .90; and PNFI and PGFI higher than .60 (Arbuckle, 2013).

Reliability was assessed by calculating the factors' composite reliability, as this is the appropriate indicator in the latent variable modeling context (cf., Debowska, Boduszek, Kola, & Hyland, 2014), and through average inter-item correlations. Composite reliability values equal to or greater than .70 (Hair, Black, Babin, Anderson, & Tatham, 2005) and average inter-item correlation values between .15 and .50 (Clark & Watson, 1995) were considered satisfactory. Furthermore, we analyzed Pearson correlations between factors to test the discriminant validity of the PCL-R factors. Very high correlations between factors (such as .50 and above; cf., Boduszek & Debowska, 2016) might indicate that the factors reflect the same concept and thus lack of discriminant validity. At last, we examined the factor's association (through Pearson and Point Biserial correlations) with previous convictions by domestic violence, previous convictions by other crimes, number of incarcerations, number of different crimes committed, psychopathological symptoms, aggression, and intimate violence frequency. As suggested by Carmines and Zeller (1979), highly correlated factors should relate differently to external variables to conclude that they truly measure different dimensions and have discriminant validity. All the analyses were performed at IBM® SPSS®.

Results

Initial analysis showed our results grossly violated the multivariate normality assumption of methods such as in Maximum Likelihood and Generalized Least Squares (Ku_{mult} = 135.69 > 10; Kline, 2011). In result, CFAs were developed using the Unweighted Least Squares method. Table 1 shows descriptive statistics for PCL-R items.

Table 2 illustrates the fit indexes of the different factorial models of the PCL-R. When considering the GFI values, the *One-factor model* presented scores lower than .90, indicating the implausibility of the model. All the two-factor and four-factor models in analysis revealed NFI scores lower than the threshold of .90, suggesting bad adjustment. Both hierarchical three-factor models (with and without testlets) showed adequate NFI scores, i.e., values higher than .90. Further exploring the results, the *Hierarchical three-factor with testlets model* presented the lowest score on the χ^2 parameter. However, its complex structure was penalized in the parsimony GFI index, revealing unacceptably low scores. The *Hierarchical three-factor without testlets model* presented the next lowest score on the χ^2 parameter. In addition, this model presented reasonable Parsimony scores (i.e., PNFI and PGFI), good levels of

Table 1. Descriptive statistics for the PCL-R items.

items	M	SD	Sk	K	items	M	SD	Sk	K
Item 1	.80	.70	.30	−.96	Item 11	.85	.70	.22	−.95
Item 2	.73	.76	.50	−1.11	Item 12	.20	.44	2.13	3.87
Item 3	.43	.58	1.01	.02	Item 13	.52	.62	.78	−.39
Item 4	.65	.66	.52	−.70	Item 14	.74	.65	.31	−.72
Item 5	1.19	.72	−.23	−.90	Item 15	.26	.50	1.82	2.50
Item 6	1.16	.62	−.11	−.47	Item 16	.37	.67	1.56	.99
Item 7	.91	.72	.14	−1.06	Item 17	.21	.44	1.89	2.69
Item 8	1.15	.76	−.25	−1.21	Item 18	.35	.63	1.63	1.38
Item 9	.18	.44	2.37	5.10	Item 19	.05	.21	4.31	16.70
Item 10	.55	.65	.78	−.46	Item 20	.14	.40	3.07	9.21

Note: M – Mean; SD – Standard Deviation; Sk – Skewness; K – Kurtosis.

Table 2. Model fit indexes for the nine PCL-R factor models.

Model		χ^2	df	NFI	PNFI	GFI	PGFI	RMR
1	One-factor	109.03	170	.79	.71	.88	.71	.047
2	Two-factor traditional	64.92	118	.87	.75	.92	.71	.043
3	Two-factor amended	66.61	134	.86	.76	.92	.72	.041
4	Hierarchical three-factor	42.31	62	.90	.71	.94	.64	.045
5	Hierarchical three-factor with testlets	36.85	56	.91	.65	.95	.58	.042
6	Hierarchical four-factor	68.65	131	.86	.74	.92	.70	.042
7	Hierarchical two-factor, four-facet	54.70	130	.89	.75	.93	.71	.037
8	Correlated four-factor	54.54	129	.89	.75	.93	.71	.037
9	Two-factor, four-facets "wrong factor"	80.99	130	.83	.71	.90	.69	.045

Note: χ^2 – Chi-Square; df – degrees of freedom; NFI – Normed Fit Index; PNFI – Parsimony Normed Fit Index; GFI – Goodness-of-Fit Index; PGFI – Parsimony Goodness-of-Fit Index; RMR – Root Mean Square Residual.

RMR, as well the highest scores in both Absolute (i.e., GFI) and Relative Fit Indexes (i.e., NFI).

The composite reliability of the Hierarchical three-factor without testlets model was .77 for Factor 1 (arrogant and deceitful interpersonal style), .81 for Factor 2 (deficient affective experience), and .62 for Factor 3 (impulsive and irresponsible behavioral style). As for the average inter-item correlations, they were .44 for Factor 1, .51 for Factor 2, .27 for Factor 3, and .29 for total scale.

All the three factors were positively associated: Factor 1 (arrogant and deceitful interpersonal style) established a .58 correlation with Factor 2 (deficient affective experience) and a .33 correlation with Factor 3 (impulsive and irresponsible behavioral style), and these last two were showed a .54 correlation between them.

Pearson and Point Biserial correlations between the three factors and previous convictions by domestic violence, previous convictions by other crimes, number of incarcerations, number of crimes previously committed, psychopathological symptoms, aggression and intimate violence frequency, were performed (see Table 3). Results showed Factor 3 (impulsive and irresponsible behavioral style) held stronger associations with previous convictions by other crimes and the number of different type of crimes

Table 3. Pearson and point biserial correlations between PCL-R Total Score (13 items) and the external correlates.

	F1_3FT	F2_3FT	F3_3FT
Convictions by other crimes[a]	.115	.158*	.246**
Convictions by DV[a]	.013	.014	.086
Number of imprisonments[b]	.060	.059	.106
Number of different crimes[b]	.075	.139*	.266**
Psychopathological symptoms[b]	−.193*	−.060	.185*
Aggression[b]	−.105	.065	.208**
Intimate violence frequency[b]	.074	.321***	.240**

Note. *$p < .05$; **$p < .01$
[a]Point Biserial correlation.
[b]Pearson correlation.

previously committed, followed by Factor 2 (deficient affective experience). Factor 3 (impulsive and irresponsible behavioral style) was also positively associated with aggression and psychopathological symptoms. Factor 1 (arrogant and deceitful interpersonal style), in turn, was negatively correlated with psychopathological symptoms. Factor 2 (deficient affective experience) revealed larger correlations with the frequency of intimate violence, followed by Factor 3 (impulsive and irresponsible behavioral style). No significant correlations between the PCL-R factors and the other variables were found.

Discussion

In the current study, we analyzed and directly compared the fit of nine competing models of the PCL-R. We used the same dataset, a sample of IPV perpetrators, and the same approach to modeling, CFA. Regarding statistical fit, the hierarchical three-factor model best fit the data among the nine models analyzed. Specifically, the one-factor model revealed to be implausible, and the two-factor and four-factor models showed bad adjustment. Both the hierarchical three-factor and the hierarchical three-factor with testlets models revealed the best Absolut and Relative indexes, however this last model lacked parsimony. The use of testlets can enhance a model fit in sake of its parsimony (DeMars, 2012). Following the principal of parsimony "*where two theories account for the same facts, we should prefer the one which is briefer … "* (Epstein, 1984, p. 119). Furthermore, it has been argued that parceling should be avoided with short scales, as this procedure is sometimes used for scales with multiple indicators to reduce the large indicator-to-factor ratio (e.g., Neal & Sellbom, 2012). Thus, for the present data, we chose the hierarchical three-factor model without testlets.

Psychometric evaluation suggested adequate properties for the hierarchical three-factor model of PCL-R. The composite reliabilities were in the acceptable range for all factors except for Factor 3 (impulsive and irresponsible

behavioral style). Eliminating items with lower factor weights did not lead to a satisfactory composite reliability (analyses not presented but provided by request). The lower reliability value for Factor 3 (impulsive and irresponsible behavioral style) may be explained by the lower scores achieved by IPV perpetrators on this factor (M = 2.13; SD = 1.79) as found in previous studies (Cunha et al., 2018). As for the average inter-item correlation analysis, all factors presented values indicating acceptable reliability (>.15), though Factor 2 (deficient affective experience) presented high values (>.50), which may suggest some correlational overlap of items within this factor (Clark & Watson, 1995). The three factors from the chosen model were highly associated, with correlation ranging from .33 between Factor 1 (arrogant and deceitful interpersonal style) and 3 (impulsive and irresponsible behavioral style) to .58 between Factor 1 (arrogant and deceitful interpersonal style) and 2 (deficient affective experience). These high correlations may indicate lake of discriminant validity, i.e., the factors may reflect the same concept. To further examined this issue, we analyzed their correlations with external variables; the factors should relate differently to external variables to conclude that they reflect truly different constructs (Carmines & Zeller, 1979). Results showed that PCL-R factors made differential contributions to penal and personal variables. Impulsive and irresponsible behavior style was positively correlated with previous convictions by other crimes, number of different type of crimes previously committed, frequency of intimate violence, and aggression. These associations are in line with the results of other studies linking psychopathy, and specially Factor 3 (impulsive and irresponsible behavioral style), to aggressive and criminal behavior (e.g., Blais et al., 2014; Hall et al., 2004; Skeem et al., 2003; Walters, 2004) and IPV perpetration (e.g., Theobald et al., 2015). Factor 3 (impulsive and irresponsible behavioral style) was also positively related to psychopathological symptoms, while Factor 1 (arrogant and deceitful interpersonal style) was negatively correlated with psychopathological symptoms. Previous research with the two-factor model also showed that Factor 2, comprising lifestyle and antisocial facets, have been positively related with distress and Factor 1, including interpersonal and affective facets, have been negatively related with psychological distress (e.g., Frick, Bodin, & Barry, 2000; Verona, Patrick, & Joiner, 2001). These results may be linking to primary and secondary typology of psychopaths and supports that secondary psychopaths are more disturbed (e.g., Lykken, 1995; Morrison & Gilbert, 2001). At last, Factor 2 (deficient affective experience) showed larger correlations with the frequency of intimate violence, which is consistent with previous research and supports the role of deficient affective experiences in IPV perpetration (e.g., Cunha et al., 2018; Swogger et al., 2007). All together, these results show that the three-factors of the PCL-R have discriminant validity among IPV perpetrators.

Results supporting the three-factor model (and its variants) have been found elsewhere (e.g., Cooke & Michie, 2001; Cooke et al., 2007; Odgers, 2005; Skeem et al., 2003; Warren et al., 2003). According to a systematic review of research on the factor structure of the PCL-R, 12 of the 28 studies identified three-factor models as empirically plausible factor structures (Filho, Teixeira, & Almeida, 2014). The three-factor model with testlets seems to have greater support, although a thorough examination of these studies (e.g., Pérez et al., 2015; Weaver et al., 2006) shows that the parsimony principle was generally overlooked. Moreover, as a limitation of the majority of these 28 studies, Filho et al. (2014) referred the use of Maximum Likelihood method despite the lack of information on data normality, limitation that we have overcome by using an adequate method for non-normal data, the Unweighted Least Squares method.

By excluding the antisocial items, the three-factor models represent a construct of psychopathy unique from the one, two, and four-factor models, and our findings led support to this conceptualization. The three-factor models demark a personality disposition from antisocial behavior, placing "*the definition of psychopathy firmly within the domain of personality pathology*" (Cooke & Michie, 2001, p. 185). One advantage of this personality focused construct of psychopathy is its greater applicability to non-forensic populations (i.e., without a criminal history). Indeed, although psychopathic individuals are more likely than others to commit crimes (Kiehl & Hoffman, 2011), not all psychopaths have a criminal history (Hare, 1993; Lykken, 1995; Mahmut, Homewood, & Stevenson, 2008). On the other hand, as a disadvantage of the three-factor model, removing criminal behaviors from the PCL-R decreases its ability to predict future violent and criminal behavior. Meta-analyses have identified criminal variable such as prior offenses, incarcerations, and juvenile antisocial behaviors as the strongest predictors of future criminal behaviors (e.g., Gendreau, Little, & Goggin, 1996; Pratt & Cullen, 2005).

Our findings show the PCL-R, the gold standard in the assessment of psychopathy, has adequate factor validity among IPV perpetrators. This is important for many reasons. First, psychopathy has been identified as a significant predictor of IPV perpetration (e.g., Cunha et al., 2018; Swogger et al., 2007) and literature has suggested, in front of psychopathic traits, the root of behavioral and psychological maladjustment is the psychopathy disorder, thus, the focus of the treatment should be psychopathy rather than IPV (e.g., Spidel et al., 2007). Accordingly, the adequate assessment of psychopathy in IPV perpetrators will allow more accurate risk predictions and more effective risk management for these offenders. Furthermore, research suggests that a specific subtype of batterer, the generally violent/antisocial, presents psychopathic traits (Cunha & Gonçalves, 2013; Holtzworth-Munroe & Stuart, 1994). The adequate identification of batterer

subtypes is of relevance when assigning men to intervention programs, as each subtype presents specific characteristics and risk of re-offending (Carbajosa, Catalá-Miñana, Lila, & Gracia, 2017; Cavanaugh & Gelles, 2005; Holthzworth-Munroe & Stuart, 1994; Huss & Ralston, 2008; Stoops, Bennet & Vincent, 2010). Knowledge of batterers' typology will thus allow to incorporate the risk-need-responsivity principles (Andrews & Bonta, 2010) in batterers' treatments, i.e. matching the intervention to the offenders' risk, criminogenic needs and characteristics, and thus increase the treatment efficacy (Cavanaugh & Gelles, 2005). Taking into account the physical, psychological, and mental health consequences linked to IPVs' direct and indirect victims, i.e., the child exposed to IPV (e.g., Coker, Smith, Bethea, King., & McKeown, 2000; Evans, Davies, & DiLillo, 2008), effectively monitoring, supervising, and treating IPV perpetrators is of great importance to politicians and practitioners.

Psychopathic traits may be present in other types of batterers than generally violent/antisocial group (Theobald et al., 2015) and literature revealed that some psychopathic traits might be more relevant to IPV than others (Cunha et al., 2018; Ehrensaft, Cohen, & Johnson, 2006; Swogger et al., 2007; Theobald et al., 2015). The three-factor structure supported by our results seems to corroborate this notion, i.e. personality traits other than the antisocial features might be expected in those individuals who commit IPV especially those related with affective and impulsive and irresponsible features. This is of relevance since some studies have claimed that intervention outcomes and efficacy are associated with specific facets of psychopathy (Hare, Clark, Grann, & Thornton, 2000; Hobson, Shine, & Roberts, 2000; Skeem, Johansson, Andershed, Kerr, & Loudin, 2007). As suggested by previous studies (e.g., Cunha et al., 2018; Hemphill & Hart, 2003; Reidy, Kearns, DeGue, Lilienfeld, & Kiehl, 2015; Swogger et al., 2007; Wallace, Schmitt, Vitale, & Newman, 2000), batterers with psychopathic traits may require a significant attention to affective deficits, impulsivity, irresponsibility, need for control, openness to novelty, and information processing deficits. Thus, when dealing with IPV offenders more than consider psychopathy construct as a whole, it is important to consider the different facets/features of psychopathy and target those features in interventions, as recommended by the need principle (Andrews & Bonta, 2010).

The adequate validity of the PCL-R among Portuguese IPV perpetrators, replicating three distinct underpinning factors (e.g., Cooke et al., 2007), suggests the structure of psychopathy seems cross-cultural and transversal to different groups of offenders. This is of particular relevance since PCL-R is widely used to inform decisions of professionals in therapeutic, correctional, and legal settings around the world (Hart, 2001; Hemphill & Hart, 2008). In Portugal, the PCL-R is also included in the main protocols of offenders' forensic assessment (e.g., Agulhas & Anciães, 2015; Matos, Gonçalves, &

Machado, 2011). Despite that, literature on cross-cultural generalizability of psychopathy and PCL-R suggests some differences in the manifestation of psychopathy across cultural settings. These findings have been used to argue for the use of a lower PCL-R cut off for European settings to diagnose psychopathy (Cooke & Michie, 1999; Cooke et al., 2005). Nonetheless, asserting the cross-cultural and the cross offenders' typology factor structure of PCL-R was not the aim of the present research. Future studies should further explore this matter by formally testing measurement invariance across different groups. Moreover, and since the Portuguese version of PCL-R is based on Hare's original cutoff score of 30 (Gonçalves, 1999), more investigation should be done to analyze the adequacy of such cut off to this population.

Some limitations are apparent in the current study. Our sample characteristics and size might raise some concerns. Firstly, the sample was nonrepresentative: participants were recruited mainly from institutions in the North of the country, their selection was not randomized. All participants were male, and the vast majority of the sample was Caucasian. Ethnic and gender differences both in IPV and psychopathy have been found (e.g., Field & Caetano, 2004; Skeem, Edens, Camp, & Colwell, 2004), hence a larger, a more ethnical diverse, and both male and female sample would be recommended. However, it is important to stress that these limitations are mainly related with the adopted study design (e.g., exclusive focus on male batterers). Second, the sample size can be problematic for CFA since the requirement of such analysis is the appropriate size of the sample, and if this assumption is not accomplished, findings may be misleading (Floyd & Widaman, 1995). Thus, since the analyses of more complex models, with a greater number of indicators and latent factors, might be affected by sample size our results could be underpowered (Boduszek & Debowska, 2016). In addition, sample size can affect the values of fit indices (e.g., chi-square, GFI, AGFI, NFI) and therefore influence the factor analysis solutions (MacCallum, Widaman, Zhang, & Hong, 1999; Sun, 2005). At last, we were unable to develop our models with more commonly used and robust methods of estimation (e.g., Holgado-Tello, Morata-Ramírez, & García, 2016; Li, 2016) due to the non-normality of our data.

In conclusion, and despite the limitations, we believe our study holds important contributions. Literature has established PCL-R adequate psychometric properties, including adequate structure validity (Cooke & Michie, 2001; Cooke et al., 2007; Odgers, 2005; Skeem et al., 2003; Warren et al., 2003). Our findings support this literature. Furthermore, our study sustained and extended for the first time, as far as we know, the use of PCL-R among a unique type of offenders – IPV perpetrators – in a particular country – Portugal. As Boduszek and Debowska (2016) stated, more studies using new data sets are needed since many studies in the field of psychopathy

conceptualization rely systematically on the same data. In addition, analyzing the factor structure of the PCL-R sheds light for the comprehension of the structure of the disorder it assesses psychopathy. According to our results, psychopathy is best represented as a personality disorder with three underpinning factors characterized by specific affective functioning, and interpersonal and behavioral styles.

Disclosure statement

No potential conflict of interest was reported by the authors.

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